

Agricultural Bioterrorism

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Examples of diseases often mentioned in the context of biological warfare

Human diseases

Smallpox
Cholera
Shigellosis

Zoonoses

Anthrax
Brucellosis
Coccidioidomycosis
EEE / VEE / WEE
Ebola/Marburg
Histoplasmosis

Melioidosis
Glanders
Plague
Psittacosis
Q Fever
Tularemia

Animal diseases

African Swine Fever
Foot and Mouth
Fowl Plague
Newcastle
Rinderpest

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**Zoonotics not
Highly Contagious**

Why did they pick the zoonotics ?

- Not highly contagious; therefore, controllable
- Many strains or isolates available in nature
- Relatively well understood; PH experience with
- Animal models for virulence testing
- Animal models for phenotypic manipulation
- Animals as production “vessels”
- Legitimate reason to work with the agents

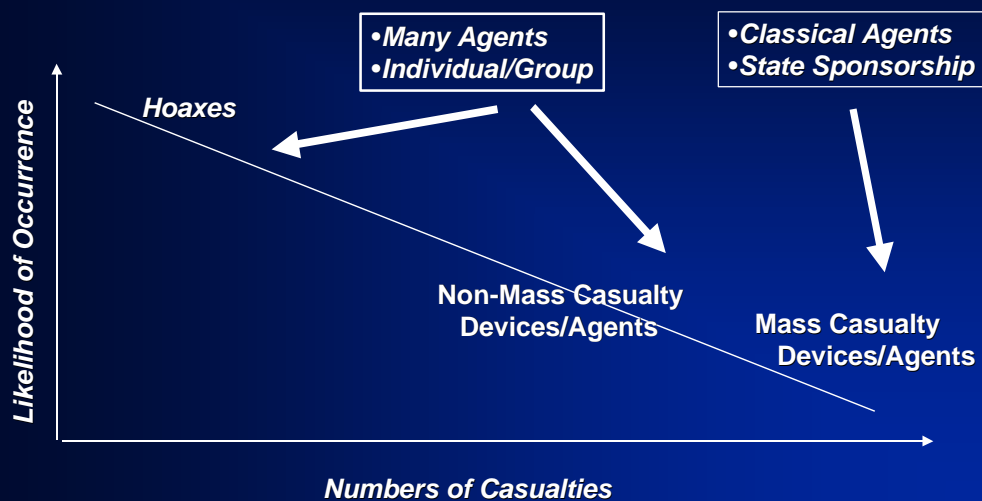
The Biological Threat has Changed

Cold War → Gulf War → Today... & Tomorrow?
Breakup of USSR

Tactical use on
the battlefield
....and strategic
use against the U.S.

“Terrorist” use against
the force, our cities...
and our livestock herds?

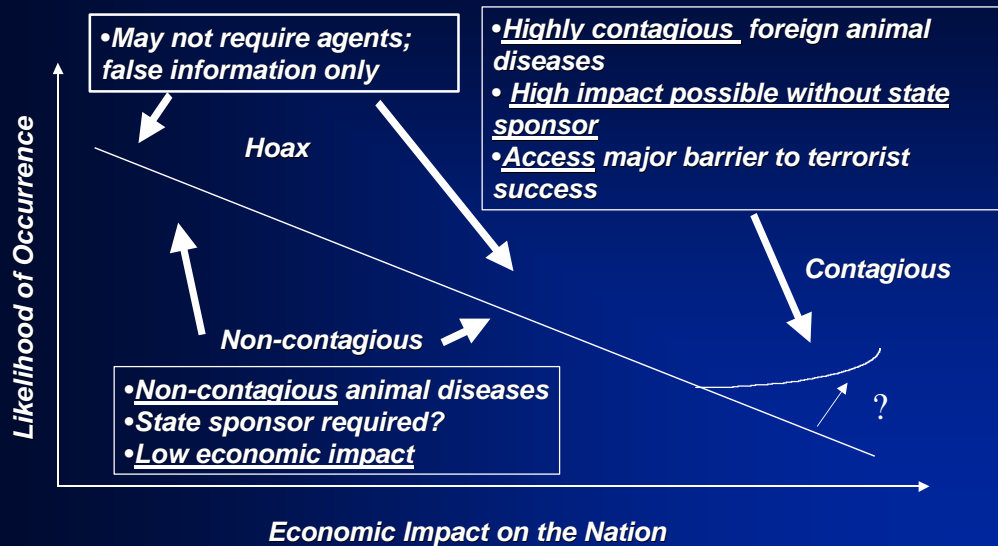
The Biological Terrorist Spectrum



Biological Terrorism FAD Agents

	Classical Agents vs. Humans	Foreign Animal Disease Agents
Intent	Can't Measure	Can't Measure
Access	From Environment	From Environment
R&D	Necessary & Difficult	<u>Not Necessary</u>
Scale up	Necessary & Difficult	<u>Not Necessary</u>
Production	Necessary & Difficult	<u>Not Necessary</u>
Weaponization	(Necessary & Difficult)	<u>Not Necessary</u>
Contagious	A few, but not highly	<u>Some Highly</u> ←

The FAD Terrorist Spectrum



Foreign Animal Disease Agents

Hog Cholera

Avian Flu

African Swine Fever

Foot and Mouth Disease

Rinderpest

Vesicular Stomatitis

Newcastle

Emerging Infectious Diseases in Livestock

“...previously unreported or previously regionally eradicated infectious diseases to which livestock populations are susceptible, cases or outbreaks of which may occur as a result of transfer of etiologic agent by animals, humans or fomites and which may simply have arisen or evolved as a result of environmental pressures and/or recombination.

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...+ **INTENT** = ***TERRORISM***

Potential Economic Impact of Emerging Animal Disease ...or Agricultural Terrorism

- Multi-billion dollar industries
- Populations are concentrated
- Small outbreak -- Widespread impact
- Local --> National --> International
- Prosperous nations take food for granted
- Low-visibility politically

VEE - Colombia/Venezuela 1995

- 75,000-100,000 Human cases in 8 months
- Equid deaths unknown
- Response: Aerial Spraying and Immunization
- Vaccination program could have prevented

Insect-borne zoonotic

FMD - Taiwan 1997

- 6,000 farms affected in 3 months
- 1 M pigs diseased; 3.8 M destroyed
- Response: Cull and Slaughter
- Loss of Japanese export market
- Estimated loss: \$5M.....\$5B+

Highly-contagious non-zoonotic

Nipah in Malaysia 1997 - 1999

- Ca. 900K pigs culled June 99.....continued
- 265 human cases; 105 deaths
- Psychological impact on humans
- Enormous economic loss
- Response: Cull and slaughter
- Truly “an emerging agent”

Contagious zoonotic

Is it natural or manmade?

- Spontaneous epidemic in an endemic area
- Spontaneous epidemic of an unfamiliar or unknown disease
- Facility accident
- Biological Warfare or Terrorist attack
- Hoax

FAD Outbreak vs. Agricultural Terrorism

	Outbreak	Terrorism
Occurrence	Seasonal- Epi. Clues (Maybe)	Almost any time
Agent	Regional Threats (Maybe)	Many Possible
Population	Selective Immunity Familiarity	Likely Unprepared
Dynamics	Traditional Cycles of Transmission	Probably Very Similar
Warning	Sentinels Possible	Warning Unlikely

What agents should we worry about and plan for?

- Highly Contagious “Human” Viruses: Just need access
- **Foreign Animal Contagious Viruses: Just need access**
- Classical BW agents: Prepare and deliver with difficulty...or buy
- Hundreds of other agents: Most have weaknesses
- Genetically Engineered Agents: The Future???

Contagious >> Aerosol-Infective > Vector-Borne > Food and Water Borne

Foreign Animal Disease **(Setting Priorities)**

- Monitor disease patterns (regional and international)
- Know the threats and means of spread
- Educate clinicians, producers and leaders
- Monitor the health of our herds
- Teach and practice preventive medicine & security
- Diagnostics and--for some diseases--vaccines
- Plan ahead (federal, state, local and individual)
- Reference laboratories and strong tech base